6.9 million, and that by 2000 the number will reach 22.4 million. Frost & Sullivan attributes this rapid growth to "a more competitive market, driven by the lower-priced voice messaging offered by the RHCs and independent LECs."[51]

This price competition from BOCs and independent LECs has caused all providers to seek new ways to meet customer demands by expanding, converging, and integrating service offerings. Frost & Sullivan explains this development as follows:

> Most of the providers in the total market are moving away from voice messaging as a stand-alone service, and are introducing other enhanced communications services to increase their competitiveness. Because prices have decreased for voice messaging services, providers are finding new services and new ways of packaging voice messaging with other services in order to differentiate themselves from the competition and sustain revenues.
>
> Many of the large service bureaus, nationwide providers, RHCs, and independent LECs have begun offering fax mail, fax-on-demand services, electronic mail, pager notification of voice messages received, interactive voice response, and other services. Even small, live answering/voice messaging service bureaus have introduced other services, such as order-taking and order fulfillment.
>
> * * *
>
> End-users will use the voice messaging services of the company that provides them with a variety of other communications services, in a package most suitable for

[51] Id. at 3-11. See also id. at 3-10, 4-5, 4-34, 4-35, 5-5, 5-6, 5-14, 5-56. For instance, Frost & Sullivan points out: "Tigon, a nationwide service bureau that charged an average of $15 to $25 per month for business voice messaging in 1992, lowered its monthly mailbox fees to the $10 to $20 range in 1993. The price reductions place Tigon's voice messaging in line with what most RHCs and independent LECs charge for business voice messaging. With volume discounts, the monthly fees can be much lower. Advanced Communications, a local voice messaging and live answering service bureau, also lowered its fees for stand-alone voice messaging. In 1992, fees averaged $15 to $25 per month, and in 1993, they ranged from $15 to $21 per month."

their needs, whether these are international messaging capabilities or local residential voice messaging services.[52]

Thus, the Commission's Computer III policy is working. Consumers are getting new and lower-priced service options, packaged the way they want them, as the result of fierce competition. In order for this competition and the resulting consumer benefits to continue, the Commission's Computer III policy must continue.

III. OUR PRESENCE IN THE ENHANCED SERVICES MARKET IS BENEFITING CONSUMERS

We have developed and continue to evolve a number of beneficial applications of our voice mail, voice store and forward, and electronic messaging/videotex gateway[53] enhanced services. This progress is consistent with the Commission's Computer III goals and has been made possible by its Computer III policy of allowing BOC integration.

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[52] Id. at 3-23, 3-24. Octel, a nationwide service bureau, provides voice messaging service that includes "two-way messaging, TigonANSWER call answering without switch integration, integration of a customer's telephone system with a Tigon Network Center, automated attendant, verbal bulletin board, voice forms, local or toll-free access for external callers to leave messages directly in the customer's mailbox, and paging." (Id., at 4-42.) VoiceCom Systems provides voice messaging with fax mail, interactive voice response, audiotex, long distance, conference calling, and 1-800 numbers. (Id. at 4-43.)

[53] Electronic messaging and videotex have converged, and there are no clear distinctions between them or their various applications.

A. Voice Mail And Voice Store & Forward Services

Voice Mail is a service which allows voice communications by telephone to be stored, retrieved, deleted, replied to and redirected to other subscribers and non-subscribers. Voice Mail is primarily used for "call answering," and is capable of answering the telephone when the line is busy or there is no answer after a number of ring cycles. In addition, "voice messaging" messages can be sent from a subscriber's voice mailbox to one or more other voice mailbox subscribers.

Voice Store and Forward is a voice storage service which enables end users to easily acquire information and permits end users to deposit information for Voice Store and Forward customers. Pacific Bell's Voice Store & Forward services are packaged as Pacific Bell Call Management ("PBCM"). PBCM provides customers with an efficient means of responding to their incoming telephone calls with easily updated recorded messages. PBCM also allows end-users to interact with recorded messages to perform transactions. PBCM Services are sold on a "port basis," and consumers may purchase a pre-packaged application or may customize the application for their unique needs.

Since removal of the structural separation requirements, Pacific Bell has rapidly expanded its service offerings for Voice Mail and Voice Store & Forward Services. More than 800,000 voice mailboxes have been sold to residential and business customers, and more than 8,000 PBCM ports are in service in California. More than 140 voice mail machines are processing more than 125 million calls per month. An additional 138 voice store and forward machines are processing in excess of 4 million calls per month.

Pacific Bell Voice Mail, our Business Voice Mail product, is available in all major metropolitan areas, and many smaller communities, throughout the state of California. Through the use of Direct Inward Dialed ("DID") services and Foreign

Exchange, Pacific Bell Voice Mail is available to all customers where ever they are located.

The Message Center, our Residential Voice Mail service, is available in the San Francisco Bay Area, Los Angeles, Orange County, Riverside County, and San Diego. The Message Center is now available to more than 5 million residences in California, and we continue to evaluate service area expansion.

B. Electronic Messaging/Videotex Gateway Services

Business Market

Pacific Bell Connection[SM] provides public, Wide-Area Network ("WAN") electronic mail ("e-mail") service with worldwide access to other public e-mail systems. Pacific Bell Connection[SM] links subscribers' mainframes, minicomputers, local area networks ("LANs"), remote PCs and Macs with others across the hall, across town, or across the ocean. With Pacific Bell Connection[SM], subscribers may avoid having to buy any new hardware or software. We provide mailboxes and other equipment, keep them on our premises, maintain them 24 hours a day, and keep them state of the art. Subscribers have a variety of options, including Directory Connection which allows simple addressing and "query-by-mail" to quickly locate other users.

Our Business Transaction Network ("BT Net") is an updated version of Pacific Bell Connection[SM] which provides a more extensive customer-driven solution that facilitates the movement of business transaction information among members of

selected communities of interest. BT Net combines both WAN and LAN support, and offers additional electronic messaging applications, including EDI.

Our first application of BT Net was for the real estate industry. Members of this community of interest include real estate brokers, loan brokers, other lenders, pest control companies, and others. These businesses are able to communicate more fully using the EDI store and forward electronic messaging capabilities of BT Net and, thus, are able to reduce their transaction times and better serve their customers.

Healthcare Market

We have expanded our BT Net application to address the EDI and interactive information service needs of the healthcare industry. These service applications have been designed to streamline the flow of healthcare-related information among many members of the healthcare community of interest. These members include patients, physicians, surgeons, medical groups, clinics, laboratories, imaging centers, pharmacies, drug manufacturers, hospitals, financial institutions, and health insurance companies. Our offerings are designed to help 1) automate many current administrative, financial, and clinical processes in the healthcare industry, 2) provide better access to medical services in areas that are underserved for healthcare, and 3) allow home access to healthcare services.[54]

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[54] Our health information services have been designed in accordance with evolving U.S. national health information management standards. In the U.S., the development of a majority of these standards is the responsibility of the American National Standards Institute's ("ANSI's") Healthcare Information Standards Planning Panel ("HISPP"). Three HISPP committees, ASCX12, HL7, and ACR/NEMA, define

Our healthcare-related service applications are classified into five different categories of features: 1) Administrative/Financial Health Information; 2) Clinical Messaging; 3) Digital Image Management; 4) Interactive Health Information; and 5) Integrated Health Information.

Administrative/Financial Health Information features provide EDI for financial and administrative transactions between trading partners in the healthcare industry. Hospitals use this application to purchase hospital equipment and supplies. Drug manufacturers use EDI transactions to sell drugs and receive payments from wholesale and retail pharmacies. Healthcare providers and payers use EDI to support a family of transactions, such as electronic claims submission, claims inquiry, eligibility inquiry and response, referrals and authorizations, and electronic funds transfer.

Clinical Messaging features allow the electronic exchange of clinical transactions such as admissions, tests, prescriptions, and radiology examinations. This application allows the customer to create an order and transmit it to the appropriate clinical information system. When the order has been executed, the result is automatically transmitted back to the customer.

Digital Imaging Management features provide radiology groups, imaging centers, and hospitals with the ability to store and retrieve digitized imaging patient records from the digital imaging repository. This application provides online access to currently active patient records, or prestaging of imaging records from deep archive for planned patient visits. Referring physicians may access image files for reviewing

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standards for administrative/financial records, clinical messaging, and diagnostic imaging, respectively.

treatment options with a patient. An on-call radiologist may review an off-hour emergency case by accessing imaging records from his home computer.

Interactive Health Information features provide medical professionals with computer access to medical libraries and commercially available information databases. Members of different health plans may interactively access wellness-education databases provided by us or others. Members may use commercially available software such as Mosaic or Netscape to interact with the various health information and education service applications.

Integrated Health Information features provide a data-query capability which allows a user to access and retrieve computerized medical records. These medical records may reside at any of our healthcare customers' facilities or in a centralized clinical data repository. This application also provides data integration capability to allow access to complete patient records by an examining physician or a patient's insurance company. An integrated patient record file may contain eligibility data, treatment plan data, laboratory test results, radiology reports, digitized imaging records, and other information. In addition, this application provides access to population-based medical records for outcome-treatment studies and customized reports in order to research serious medical problems or disease control, or to address health policy-related issues.

Schools

The California Community College System is a subscriber to Pacific Bell Connection[SM], with 1,000 of our mailboxes spread throughout community colleges across the state. School administrators in particular have found our service to be very helpful for the exchange of messages.

We are applying similar electronic messaging applications via our Knowledge Network Gateway to improve communication among, and bring educational resources to, teachers, students, and administrators. Schools have access to the Knowledge Network Gateway via computers on LANs at the schools, which are connected to the network with high-speed tariffed network services, enabling many people to participate at the same time.

The electronic messaging capabilities of our Knowledge Network Gateway encourage collaborative learning and communication among classes almost anywhere in the world. Moreover, teachers can share lesson plans and develop personal "networks" with other teachers and can integrate online resources into their lesson plans. In addition, our Knowledge Network Gateway provides California's students and educators with high speed, navigated, computer access to the world's educational resources. Information content can be obtained from Internet-based information sources as well as from other educational resources tied in with the California curriculum. Network connection to information allows schools to share educational resources, keeping costs lower, and allows students to learn telecomputing skills needed for higher education and for business and other careers. Most important, it

provides students and teachers with access to current information and information that may not otherwise be available.

Knowledge Network Gateway employs our file servers to store and forward e-mail messages and information content. For e-mail, the students access our file server which downloads messages into their computers or discs so that they can read the messages. Students can store the messages in their mailboxes in our file server. Students also can access menus in our file server to get help in accessing desired sources for information content. Knowledge Network Gateway is part of our vision to bring the public telecommunications network, the Knowledge Network, to schools and libraries for voice, data, and video communication.

Internet Access

We have further developed our Pacific Bell Connection[SM] and Business Transaction Network applications to include electronic messaging applications in conjunction with more widespread Internet access. Depending on customer needs, these applications can include the following functions associated with the enhanced services equipment: e-mail service in case the customer's server goes down;[55] storage of incoming e-mail until the customer dials the network to retrieve it;[56] back-up domain name services ("DNS") to translate Internet names to Internet addresses in case the customer's server goes down; primary DNS to provide these translations on a regular

[55] Internet Mail Relay/Exchanger service ("MX").
[56] Store and Forward E-Mail Services ("SMTP").

basis; and a store and forward contact point for group electronic messaging communication via Internet news feeds.[57]

Distribution Of Movies

We have developed our store and forward capabilities to include Cinema Of The Future[SM]. With this application, which includes a file server and digital compression, we can distribute movies to theaters. Using a terminal employing a graphical user interface, an employee of the theater can interact with our reservation and scheduling network management system in order to have movies downloaded at appropriate times.

Multi-Media Development

We have evolved our e-mail applications to include electronic messaging for multi-media development via our Media Park[SM]. This platform incorporates various applications, including accessing, gathering, file transferring, and storing and forwarding of information.

Using these applications, Media Park[SM] is designed to help end user customers to use their personal computers to browse through and obtain digitized information from file servers of various third-party information providers for pre-production and post-production film and other multi-media development. For

[57] Network News services ("NNTP").

instance, an end user can 1) obtain still images, video clips, and audio clips which can be incorporated into a business presentation or film, 2) obtain pictures of production locations in order to select a location for a film, 3) obtain information about acting candidates in order to select actors for a film, and 4) obtain film for editing. The end users have the option of storing information that they have gathered and interacted with in one of our store and forward file servers for later retrieval. Multiple end users can work together on the same project via e-mail interaction, including file transfers. In this manner, Media Park[SM] is designed to provide a quick and relatively inexpensive means of acquiring, interacting with, and storing information needed for multi-media development from diverse and geographically dispersed sources.

We expect to expand these applications to include additional types of information. Our plans are dependent, however, on the Commission's continuation of its Computer III policy.

IV. BOC ACCESS DISCRIMINATION IS PREVENTED BY THE EMERGENCE OF FIERCE COMPETITION AMONG PROVIDERS OF NETWORK SERVICES

Market forces in the telecommunications industry ensure that the BOCs will not discriminate against ESPs in the provision of network access. If a BOC were to do so, the ESP currently could transfer much, if not all, of its traffic to a competitor of the BOC. Soon all ESPs will have options for all their traffic. ESPs will compare service alternatives and choose the best and most efficient service. To succeed in the face of fierce competition, BOCs must provide the best service that they can to every customer.

Local Competition

The exclusive local franchise is quickly coming to an end. Twenty-three states currently allow at least some form of local competition, and expansion of this freedom is accelerating.[58] Six companies have been certified as local phone companies to compete against NYNEX in New York.[59] Illinois, Maryland, and Washington also have given full "co-carrier" status to CAPs.[60] The California Public Utilities Commission ("CPUC"), in its 1993 Infrastructure Report to the State Legislature, called for full competition in California by January 1, 1997.[61] Now, however, the CPUC is expected to issue rules and grant approvals for local phone competition much sooner.[62] On April 3, 1995, Pacific Bell filed a report at the CPUC entitled "Competition to the Core," in which we seek the implementation of local competition as early as January 1, 1996, with regulatory reform and a universal service funding plan.

Competitors are ready to take immediate advantage of these regulatory and network changes. The California Cable Television Association was reported as recently stating that some cable partnerships and joint ventures "could begin offering service immediately in some capacity."[63]

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[58] "States Meander Toward Rules To Foster Cap Competition," Telco Business Report, July 5, 1994.

[59] "Tele-City on a Hill," Forbes, February 27, 1995, p. 64.

[60] MFS Communications Emerging Growth, Standard & Poor's Engineering & Special Situation, October 17, 1994, p. 6.

[61] Enhancing California's Competitive Strength: A Strategy for Telecommunications Infrastructure, California Public Utilities Commission, November 1993.

[62] "Phone competition expected to call early," San Francisco Business Times, March 3, 1995, p. 1.

[63] Id.

A joint venture consisting of Sprint, Tele-Communications, Inc., Comcast Corp., and Cox Cable Communications, Inc. "will introduce competition into the local exchange market through a bundled offering of local, long distance, wireless communications, and cable TV services." The joint venture was the high bidder at the recently concluded broadband PCS spectrum auction. The new venture "will achieve national reach through cable affiliates, and [together with] Teleport Communications Group...is expected to provide local access services through its broadband metropolitan networks."[64] "Sprint Corp. and its cable-television partners have agreed to spend $4 billion during the next three years to invade local telephone markets, and Sprint reassigned the chief of its long-distance unit to lead the charge."[65] Sprint stated that this investment is expected to increase to $8 billion over the next several years.[66]

Similarly, MCI is rapidly preparing for full local exchange competition. MCI plans on making California one of the first areas it serves for local service with its $20 billion MCI Metro service.[67]

Although some of the plans for local competition depend on the pending actions of state regulators, other plans have been long implemented. Technology and the marketplace have not waited for regulators, who can no more halt new providers from entering the market than King Canute could command the ocean to subside. Competition

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[64] "Sprint, Three Cable TV Partners Take on Local Exchange Market; Teleport To Join the Effort," Telecommunications Reports, October 31, 1994, p. 1.

[65] "Sprint, Partners Map $4 Billion Phone Invasion," Wall Street Journal, March 29, 1995, p. B.11.

[66] "Sprint Puts Price Tag Of Up To $8 Billion On Foray Into Local Phone Markets," Wall Street Journal, March 30, 1995, p. B. 6.

[67] "MCI Planning to Enter Local Phone Markets," N.Y. Times, January 5, 1994. p. D6.

is here now. ESPs have increasing choices, and any BOC discrimination against ESPs would simply drive away business.

Private And Virtual Private Networks

Businesses today receive a significant portion of their dial tone for all switched services, including access to voice mail and online services, from sources other than the BOCs and other LECs. We estimate that about one-third of California businesses receive their dial tone from PBXs. Private networks, such as those owned by Hughes Aircraft, General Motors, the State of California, and the Federal Government, use no LEC dial tone for "on-net" calls. Private networks can be linked to networks of CAPs, IXCs, VANs, and others in order to obtain enhanced services.

Virtual private networks offered by interexchange carriers also provide local service and can therefore be used to obtain enhanced services without using the switched networks of the BOCs and other LECs. For instance, AT&T's Tariff 12 and MEGACOM services originate dial tone at AT&T's switches. MEGACOM completes all calls placed by the customer, be they local, interstate or international. AT&T's SDN service provides dial tone, and terminates local calls to "on-net" numbers. IXCs give volume discounts to customers for switched usage, in effect encouraging the use of services such as MEGACOM for all calls. Special promotions by AT&T give customers discounts that apply only to new volumes of intrastate traffic, an incentive to switch over to AT&T any intraLATA traffic that it is not already carrying. When customers use these services in conjunction with special access facilities which may be provided by a CAP

directly to an IXC POP, customers today effectively are selecting their IXC as their local exchange provider. Northern Business Information estimates a 22 percent compound annual growth rate for virtual private network revenues over the 1992-97 period. We cannot measure how much intraLATA traffic we have lost this way, but the huge shrinkage in our share of the 800 market (revenues down 45 percent in the last five years) is probably only a fraction of the amount lost.

Competitive Access Providers ("CAPs")

CAP network services can be used by ESPs today for some of their transport needs. This capability is expanding rapidly as CAPs add switches to their networks. With their own switches, CAPs can provide both local exchange and switched access services for ESPs and others.

Teleport has installed 5ESS switches in Los Angeles, San Francisco, and San Diego. It requested assignment of full prefixes, each with 10,000 numbers, and we have responded by filing contracts at the California PUC. Teleport also recently announced the launch of its new generation Asynchronous Transfer Mode ("ATM") switched data services which it will use to concentrate on providing local service.[68]

MFS has two Class 5 switches in Los Angeles and two in San Francisco which it currently uses for interLATA service, but which can be used for local service. MFS is preparing to put in a Class 5 switch in San Diego. MFS also has installed ATM

[68] "Teleport readies local switched ATM service," Network World, April 3, 1995, News Section, p. 6.

switches in San Francisco and Los Angeles and is installing an ATM network in San Jose. In addition, MFS succeeded in a hostile takeover attempt of Centex Telemanagement, a California-based IXC that resells Centrex services combined with long distance lines.[69] This immediately put MFS into the business of providing many local telecommunications services, plus long distance. In its recent 10K filing at the Securities and Exchange Commission, MFS reported a further acceleration of its growth plans. MFS intends to deploy fully integrated local and long distance switched services to approximately 50 areas.

ICG has placed a 5ESS switch in Oakland, and is installing two more in Los Angeles and Irvine. Linkatel, Pacific Lightwave, Time Warner AxS, Times Mirror Cable Television, and Brooks Fiber (formerly Phoenix Fiberlink) also reportedly plan to have their own switches in California.

These switches will complete the fiber networks that the CAPs have been installing in California's high density telecommunications corridors. Today, eight CAPs serve over 100 California communities. These CAP networks provide ready alternatives to the BOCs' and other LECs' networks for fast growing enhanced services which are used by large businesses, such as financial institutions, that are concentrated in metropolitan areas. These businesses transport a tremendous amount of data. Enhanced functionality, such as EDI, is used increasingly to help them with efficient data transactions, including transfers of money and inventory control. If we were to

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[69] See "Centex Invites New Bids to Thwart MFS Takeover," San Francisco Chronicle, April, 30, 1994, p. D2; and "MFS Communications Co.", Wall St. J., May 3, 1994, p. A6.

discriminate against ESPs for network access, they could increasingly use the networks of CAPs for their traffic.

A large amount of our business is immediately vulnerable to this type of competition because our revenues are highly concentrated by service area. 30 percent of our business revenues come from the 0.5 percent of our serving territory located in or near the major downtown areas. 1.5 percent of the land area accounts for 60 percent of the business calling revenues. 5.9 percent of our land area accounts for 85 percent of business revenues. Usage is also highly concentrated by customer. One percent of our business customers account for 45 percent of our statewide intraLATA toll volumes. Ten percent drive 75 percent of the total. Residential service is similarly concentrated. We estimate that 25 percent of all residential customers generate 75 percent of our intraLATA toll revenues.

In some of our markets, CAPs have made spectacular inroads. In the second quarter of 1993, and again in the first quarter of 1995, Quality Strategies measured our proportion of high capacity circuits[70] provided to large business customers in parts of the Los Angeles and San Francisco markets that other providers of high capacity services have entered.[71] In those parts of the Los Angeles market, our

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[70] Quality Strategies measured only special access and exchange private lines, although CAPs are also offering, or planning to offer, additional services such as local switching services and high-speed data transfer services. Quality Strategies determined proportions on a DS1 equivalent basis.

[71] Customers were chosen by Quality Strategies using random number generation algorithms from lists provided by business list brokers. Customers were surveyed in zip codes in San Francisco and Los Angeles, reaching far beyond the financial districts of each city. The sample sizes were designed to provide statistical validity based on a 90 percent confidence interval, with a 6 percent margin of error for each metropolitan area surveyed.

proportion of all special access services fell from 74 percent in 1993 to 64 percent in 1995. In those parts of the San Francisco market, we fell from 81 percent of special access in second quarter 1993 to 65 percent in first quarter 1995. We also measured Sacramento and San Diego markets and found significant losses there.

% of DS1 Equivalent Services Provided by Pacific Bell

	1993	1995
Parts of Los Angeles:		
Total special access circuits	74%	64%
Parts of San Francisco:		
Total special access circuits	81%	65%

What is most astonishing about this loss of market power to CAPs is that it has preceded the California PUC's authorization of full local exchange competition. These CAP market shares were achieved with no authority to hold out the availability of intraLATA switched service in competition with the LEC. This portends explosive growth in the near future when CAPs obtain this authority.

CAPs today provide transport for local services offered by IXCs or other high volume users, and they can serve the transmitters of cellular, PCS, and other wireless networks. The intense access competition provided by CAPs is evidenced by the LECs' sharp decreases in their access prices in 1993 and 1994, with prices set well below their price caps.[72]

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[72] See Robert G. Harris, Reply Report on LEC Price Cap Reforms: United States Telephone Association, June 24, 1994, p. 13, Price Cap Performance Review for Local Exchange Carriers, CC Docket No. 94-1.

The central offices currently tariffed by Pacific Bell for interstate special access and switched transport collocation give the CAPs access to over 82 percent of our special access DS1 and DS3 business and nearly 35 percent of our switched access business. As of March 1995, we had 72 orders for collocation in 46 central offices.[73]

The CAPs expect to further expand quickly. In a 1992 interview, Royce Holland, president of MFS, was reported to have explained:

> Following interconnection authority for CAPs, a relative rapid resolution of local dial-tone, switched access, interLATA toll, and number portability issues is likely, he predicted. By the end of the decade, he predicted that all of the local exchange market would be deregulated, competitive access would be a multi-billion dollar industry, and CAPs would have a 35% share of the market.[74]

The two leading CAPs in Los Angeles and San Francisco did not enter until 1989 and 1990. Yet, in the areas and lines of business that they have entered, they already have about as much share as the entire non-AT&T share of the interexchange usage market. In New York City, where CAPs first entered the business, it was estimated in 1993 that CAPs already held 50 percent of the DS1/DS3 market.[75] For businesses in the downtown areas, CAP fiber is the alternative local loop. We estimate that MFS and Teleport alone have enough fiber installed in the Los Angeles and San Francisco

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[73] We are appealing the Commission's collocation requirements. Pacific Bell v. FCC, Case No. 94-1547 (D.C. Cir.). Regardless of how our appeal turns out, we intend to provide forms of interconnection that ensure that CAPs continue to have a fair opportunity to compete with us.

[74] Telco Competition Report, Vol. 1, No. 1, p. 14 (October 15, 1992).

[75] Reform of the Interstate Access Charge Rules, FCC RM 8356, Reply Comments of Southwestern Bell Telephone Company, November 16, 1993, Appendix I, p. 4.

downtown areas to handle all our transport traffic for these areas. California is not alone. "In total, MFS now provides service or has operations in development in 46 metropolitan areas, representing 132 business markets."[76] If BOCs were to discriminate against ESPs, they would quickly transfer their EDI and other downtown area business to the CAPs.

Cable TV Providers

Downtown areas will not be islands of competition. Cable TV providers will quickly bring network services competition to the mass market, ensuring that we cannot discriminate against providers of mass market voice mail and e-mail services.

The installation of fiber in cable television systems eliminates the repeater and other equipment which hinder two-way transmission over cable. Other technological limitations have fallen away as well. Video technology has been revolutionized by advancements in video compression technology which enable 500, and possibly 1,000, television channels to be carried simultaneously over coaxial cable. Using digital compression technology, two-way video services, as well as voice and data, may be delivered to homes and businesses over a hybrid fiber optics-coaxial cable network. For example, in 1993 AT&T announced its "Cable Loop Carrier" technology to allow both television and telephone conversations to travel through a coaxial loop at the same

[76] "MFS Finalizes Denver Acquisition; Now Has Presence In 46 Metropolitan Areas," PR Newswire, Financial News, March 1, 1995.

time.[77] At least three cable TV systems in California are interactive; another 50 have been undergoing modifications to make them interactive.

These technological breakthroughs give cable TV providers access to lucrative telephone revenue streams with modest incremental investment. The spreading of network investment across combined telephone and television revenue streams fundamentally changes both industries.

Teleport and TCI have been building fiber loops throughout downtown San Diego; Time Warner announced plans for a 60-mile loop.[78] A five cable company consortium (Cox, TCI, Comcast, Continental, and Time Warner) has access to 46 percent of Pacific Bell's residence customers. TCI announced plans to build a fiber optic backbone in the Bay Area by 1995.[79] TCI and three other cable companies are also planning to use fiber cable to interconnect their "headends," forming a regional hub network.[80] This cable TV alliance is made up of TCI, Viacom, Century, and Lenfast Communications. The four plan to interconnect their "super-headends" at Sunnyvale (TCI), San Francisco (Viacom), Albany (Century), and Oakland (Lenfast). The network will ring the Bay Area with two separate fiber routes in each direction. This duplication will provide diversity and increased reliability. Each route is expected to contain at least 24

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[77] "AT&T System Calls on Dial Tone, Video," Newark Star Ledger, August 1, 1993, p. 17.

[78] James Crawley, "Fiber-Optic Ring to be Built in Area: Time Warner Announces Plans for 60-Mile Loop," San Diego Union Tribune, June 24, 1993, p. 1A.

[79] "[F]iber loop brings future closer," San Jose Mercury News, October 30, 1993, p. D10.

[80] Gary Kim, "Viacom, TCI Fiber Net Plans Advance," Multichannel News, November 2, 1992, p. 31.

strands of fiber.[81] This regional hub network will interconnect with the cable networks these companies already have in place. Thus, for minimum incremental investment these cable companies will create a complete overlay network in the Bay Area capable of providing local telephone service.

TCI also stated its intention to spend $2 billion nationally between 1994 and 1998 in order to lay 7000 route miles of high capacity fiber (1.1 million fiber miles based on 144 fibers per route) to serve its 10 million customers throughout the country. The project includes the greater San Francisco Bay Area, where TCI operates cable systems in 25 communities and is installing fiber in many more.

Similarly, Cox Cable is reported to be installing excess capacity in its fiber networks in anticipation of offering telecommunications services. Cox installed approximately 200 fiber route miles, or 6000 fiber miles, in the San Diego area.

The Convergence Of Telephone And Cable TV Competitors

The convergence of telephone and television has caused CAPs and cable TV providers to be in the same business. The two industries have merged. Digital Direct is owned by TCI. Teleport is owned by several cable providers including Cox, TCI, Comcast Corp., Continental Cablevision, and Time Warner. AxS is owned in part by Time Warner. Eastern Tele Logic is owned by Comcast. Hyperion Telecommunications is owned by Adelphia and Continental (Adelphia also owns CAPs in Syracuse and

[81] "National Fiber Optic Network: Telecommunications Inc. (TCI) Accelerates Its Four-Year, $2 Billion, Nationwide Fiber Optic Construction Project," Edge Publishing, April 19, 1993.

Pittsburgh). Indiana Digital Access is owned by Time Warner. Kansas City Fibernet is owned by TCI and Time Warner.[82] MFS, which is partially owned by Peter Kiewit & Sons and partially publicly held, is the only major CAP without strong cable ties.

US West has a 25 percent interest in Time Warner, the country's second largest cable operator with 6.8 million subscribers. Time Warner is the fifth largest cable operator in California with 331,000 subscribers in 1993. Time Warner gained authority to provide a comprehensive range of local and residential business telephone services in Rochester and Albany. Cable ventures will be in a position to do the same in California in the near future.

Sprint has formed a partnership with "several cable TV companies that want to start marketing their own local phone service to residential customers in the Chicago area and other cities by the beginning of [1996]." In west suburban Wheaton, Illinois, MCI "plans later this year to begin a test of its own cable telephone service with Jones Intercable in as many as 1,000 homes."[83]

The "interactive services" that these alliances plan to provide through cable companies include basic telephone service. Nationwide, cable company facilities pass 95 percent of the nation's homes. Therefore, if we were to discriminate against any ESPs for network access, they could soon transfer all their network business to our competitors.

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[82] Reform of the Interstate Access Charge Rules, FCC RM 8356, Reply Comments of Southwestern Bell Telephone Company, Nov. 16, 1993, Appendix I, Table 1, p. 3.

[83] "Ringing Up Revolution New Phone Age Comes To Illinois First," Crain's Chicago Business, January 16, 1995, p. 15.

Wireless Providers

The twisted pair loop increasingly fails to meet customer demands for mobility. Cellular providers serve 16 million subscribers nationwide, over two million in California. The BOCs' cellular affiliates serve only half of the cellular subscribers. Already, we estimate that 30 percent of the business loops in California are provided by cellular. Pacific Bell no longer has a cellular affiliate, but is starting from scratch with PCS. The growth rate of cellular has been remarkable. More cellular loops are being built in the United States each year than landline loops. PCS is expected to rapidly increase this competition.

Nextel, with a service area in California that covers approximately 30 million residents,[84] is building the nation's first integrated all-digital wireless communications system that combines cellular, two-way radio, and advanced messaging in one unit. Nextel's new focus is on serving business customers. Nextel is about 20 percent owned by Motorola, and Craig McCaw just announced that he will invest up to $1.1 billion in Nextel.[85] In addition, "Cellular Digital Packet Data (CDPD), a highly reliable, encrypted packet data overlay on the existing cellular networks, is now in broad deployment with more than 60 U.S. cities slated for service this year."[86] Moreover, Mobile Telecommunications Technologies Corp. ("MTEL") announced that Motorola is providing

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[84] "Nextel supports flood ravaged bridge re-opening," Business Wire, March 20, 1995.

[85] "Cellular Titan McCaw to Inject Up to $1.1 Billion Into Nextel," Los Angeles Times, April 6, 1995, p. D.1.

[86] "Sierra Wireless Award-Winning Packet Plus...," Business Wire, March 20, 1995.

a subsidiary of MTEL "with messaging equipment for the first nationwide ReFLEX two-way wireless messaging network." ReFLEX is a high speed transport protocol that is "optimized for data messaging and provides state-of-the-art technology for wireless messaging."[87] Microsoft Corp. is joining MTEL "to build a $150 million advanced wireless network for sending and receiving data...."[88]

Wireless will provide another alternative loop through which telephone customers may obtain their local service. Moreover, there is no reason to think that consumers will automatically connect their wireless loops to the BOC or other LEC. Wireless providers will be able to take advantage of two-wire competition and multiple switch providers. Both BOC and cable company fiber networks will be able to transport the landline portion of wireless calls. In addition, the Commission has licensed about 3,600 private microwave paths in California, and McCaw uses microwave to provide intraLATA and interLATA connections between cell sites or switches.

Wireless voice mail and e-mail businesses are expected to grow faster than other enhanced services. If we were to discriminate against ESPs, we would simply drive them to choose competing wireless and cable TV providers.

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[87] "Motorola Supplies First Nationwide Two-Way Reflex Messaging System," PR Newswire, Financial News, March 20, 1995.

[88] "Microsoft Plans Wireless Data Network With Mobile Telecommunications Firm," Wall Street Journal, March 24, 1994, Section B, p. 6.